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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,323	04/09/2004	Yosuke Hosoya	09792909-5853	9692

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EXAMINER	
ECHELMEYER, ALIX ELIZABETH	
ART UNIT	**PAPER NUMBER**
1795	

MAIL DATE	DELIVERY MODE
05/13/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/821,323	HOSOYA ET AL.	
	Examiner	Art Unit	
	Alix Elizabeth Echelmeyer	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the amendment filed February 26, 2008. Claims 1 and 5 have been amended. Claims 1-5 are rejected finally for the reasons given below.

Claim Interpretation

2. Claims 1 and 5 are directed to a positive active material *comprising* particles each having a layered structure, wherein the layered particles *comprise* an inner particle and a coating layer *comprising* a homogenous compound oxide of lithium and titanium formed on *at least parts of* the surface of the inner particle (emphasis added). Applicant is reminded that, according to the MPEP comprising is an open-ended term, analogous to including or containing, and does not limit (MPEP 2111.03). In other words, according to the instantly filed claims, the positive active material comprises particles each having a layered structure, *but may also comprise any other particles or components*. The coating layer of the instant claims comprises a homogenous compound oxide of lithium and titanium, *but is not limited to only the homogenous compound oxide*. In other words, according to the language of the claims, the compound oxide of lithium and titanium, which is formed on at least parts of the surface of the inner particle, makes up part of the coating layer, but not necessarily the entire compound layer, since the coating layer *comprises* the compound oxide.

For the purposes of examination, the claims will be given their broadest reasonable interpretations, including the interpretation of the term "comprising" as defined in Section 2111.03 of the MPEP.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oesten et al. (US 2001/0046628 A1) in view of Spitler (US 2004/0197657).

Oesten et al. disclose a coated lithium nickel mixed oxide particle and the method of making the particle for use as the cathode material in an electrochemical cell. The coated lithium mixed oxide particles are used to improve the properties of the electrochemical cell. The particle core is a lithium mixed oxide containing nickel ([0032]) such as $Li_xNi_yMn_{2-y}O_4$. The particle coating is a metal oxide or a mixture of alkali metal compounds and metal oxides ([0033], [0034]). The use of titanium oxide as the particle coating is disclosed ([0034]).

The lithium mixed oxide particles of the active material of Oesten et al. correspond to the first compound oxide of lithium and nickel in claims 1 and 5 of the instant application. The particle coating of, for example, titanium oxide as taught by Oesten et al. corresponds to the second compound oxide of lithium and titanium of the

instant application. As in the instant application, the titanium oxide of Oesten et al. is coated on particles of the lithium mixed oxide containing nickel.

Regarding claim 2, Oesten et al. do not explicitly teach that the weight ratio of the first compound oxide to the second compound oxide is between 96:4 and 65:35. Oesten et al. do teach that the weight ratio of the coating metal oxide to the lithium mixed oxide particles is from 0.01 to 20 percent. The weight ratio of the alkali metal to the lithium mixed oxide particles in the cathode is from 0.01 to 10 percent. It would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the weight relationship between the core oxide material and the coating oxide material such as taught by Oesten et al. in order to provide a thick enough coating that inhibits the undesirable reactions of the acid with the electrode material. It has been held that where general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. In re Aller, 105 USPQ 233. MPEP 2144.05 (IIB).

As for claims 1 and 5, Oesten et al. fail to teach that the titanium oxide particle coating is one of those listed in the claims. Additionally, Oesten et al. fail to teach the limitation of claim 3 that the titanium oxide material has a spinel structure.

Spitler et al. teach the use of a lithium titanium spinel oxide ($Li_4Ti_5O_{12}$) as the positive material for the cathode of a lithium ion battery ([0001]).

Spitler et al. further teach that the lithium titanate spinel oxide allows for extremely high charge and discharge rates and a large number of charge and discharge cycles ([0022]).

With regard to the limitations concerning the homogeneity of the compound oxide, Spitler et al. teach the lithium titanate spinel oxide of the claims and do not teach the oxide being part of a mixture - it is homogenous.

It would be desirable to use the lithium titanium spinel oxide ($Li_4Ti_5O_{12}$) of Spitler et al. as the lithium oxide of the coating of Oesten et al. since the lithium titanium spinel oxide ($Li_4Ti_5O_{12}$) allows for extremely high charge and discharge rates and a large number of charge and discharge cycles.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the mixture of alkali metal compounds and metal oxides coating of Oesten et al. to include a spinel lithium titanate oxide as the titanium oxide material such as taught by Spitler et al. in order to enhance the charge and discharge rate of the electrochemical cell. Such a spinel compound is structurally stable in the electrolyte of the battery.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oesten et al. in view of Spitler et al. as applied to claim 1 above, and further in view of Naruoka et al. (US 6,893,766 B2).

The teachings of Oesten et al. and Spitler et al. as discussed above are incorporated herein.

Oesten et al. and Spitler et al. teach the coated positive electrode active material of the instantly claimed invention, but fail to teach that the material has a mean particle diameter of 5 to 20 μm.

Naruoka et al. teach a positive active material for a secondary battery. The positive active material is lithium nickel composite oxide (col. 2 lines 45-56). The mean particle diameter of the lithium nickel composite oxide is 4 to 25 μm (col. 3 lines 44-51).

Naruoka et al. teach that if the mean particle diameter of the positive electrode active material is smaller than 4 μm, there may not be continuous contact with the electrically conductive material. Naruoka et al. also teach that if the mean particle diameter of the positive electrode active material is larger than 25 μm, the electrolyte may not penetrate the electrode material. This would adversely affect the charge and discharge rates of the battery (col. 3 lines 51-59).

It would be desirable to use make the positive active material of Oesten et al. in view of Spitler et al. having particles in the range of 4-25 μm, within which 5-20 μm falls, since particle sizes outside of that range adversely affect the charge and discharge rates of the battery, either by preventing continuous contact with the electrically conductive material or by not allowing the electrolyte to penetrate the electrode material.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the positive electrode active material of Oesten et al. in view of Spitler et al. having a mean particle size in the range of 5 to 20 μm as taught by Naruoka et al. in order to maintain electrical conductivity within the battery and improve charge and discharge rates in the battery.

Response to Arguments

6. Applicant's arguments filed February 26, 2008 have been fully considered but they are not persuasive.

First, Applicant asserts that the amended claims require that each particle of the anode active material has a layered structure. The examiner disagrees. As discussed above, the claims require only that the active material *comprise* layered particles.

As for the next argument, that Oesten et al. teach that the coating is a mixture of alkali metal compounds and oxides, the examiner agrees with this teaching; however, the lithium titanium oxides are homogenous, even if the coating layers themselves are not. Because the coating layer only need *comprise* the homogenous lithium titanium oxide, the coating layer may include other materials as long as the lithium titanium oxide itself is homogenous.

Additionally, it is not clear why Applicant's statement that Oesten et al. does not teach or even fairly suggest that the mixture of alkali metal compounds and oxides, or any coating, would improve conductivity and maintain capacity and cycle durability is relevant to the instant case. These limitations are not found in the claims and, even if they were, would not be relevant to patentability as the claims are structure claims.

As for the arguments concerning the Spitler et al. reference, Applicant discusses the coating method of Spitler et al. The reference is relied upon not for its method, since none of the instant claims are method claims, but for the teaching of a lithium titanium spinel oxide for use as a positive material for the cathode of a lithium ion battery. One of

ordinary skill in the art, when considering Oesten et al. in view of Spitler et al., would see that, at the very least, it would be obvious to try the positive active material of Spitler et al. as the lithium titanium oxide coating in Oesten et al.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alix Elizabeth Echelmeyer
Examiner
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/Susy N Tsang-Foster/

Supervisory Patent Examiner, Art Unit 1795